

CLAIMS

What is claimed is:

1. A system for dispensing items comprises:

a first dispensing station; and

a first conveyor for transporting containers to said dispensing station,

wherein said first dispensing station comprises:

a dispenser for directing items to said containers;

a mechanism for spacing said containers to a predetermined pitch;

a transfer wheel for removing said containers from said first conveyor;

a star wheel for receiving said containers from said transfer wheel and for positioning said containers in alignment with said dispenser; and

a turret for removing said containers from said star wheel.

2. The system of claim 1, wherein said dispenser comprises a rotary, vibratory dispenser comprising:

a feeder bowl for receiving a plurality of items to be dispensed;

a feeder bowl vibration device for vibrating said feeder bowl;

a feeder bowl rotation drive for rotating said feeder bowl;

a plurality of dispensing paths positioned around said feeder bowl; and

at least one dispensing path vibration device for vibrating each of said dispensing paths proportionately to a physical characteristic of each of said items,

wherein said feeder bowl vibration device vibrates said feeder bowl and said feeder bowl rotation drive rotates said feeder bowl, so that said feeder bowl supplies items uniformly to said dispensing paths and wherein said at least one dispensing path vibration device vibrates said dispensing paths, so that said dispensing paths dispense said items singularly, wherein said feeder bowl rotation drive rotates said dispensing paths.

3. The system of claim 1, wherein said dispenser comprises a vibratory dispenser comprising:

a feeder bowl for receiving a plurality of items to be dispensed;

a feeder bowl vibration device for vibrating said feeder bowl;

a plurality of dispensing paths positioned around said feeder bowl;

at least one dispensing path vibration device for vibrating each of said dispensing paths proportionately to a physical characteristic of each of said items; and

a dispensing path rotation drive for rotating said dispensing paths, wherein said feeder bowl vibration device vibrates said feeder bowl, such that said feeder bowl supplies items uniformly to said dispensing paths, and wherein said at least one dispensing path vibration device vibrates said dispensing paths, and said dispensing path rotation drive rotates said dispensing paths, such that said dispensing paths dispense said items singularly.

4. The system of claim 2, further comprising:

a dispensing head positioned at a distal end of each of said dispensing paths for receiving said singularly-dispensed items, wherein each of said dispensing heads may direct predetermined quantities of items to a container or divert predetermined quantities of items away from a container.

5. The system of claim 1, wherein said first conveyor receives said containers from said turret and transports said containers from said first dispensing station to a packaging station.

6. The system of claim 1, further comprising:

a plurality of dispensing stations,

wherein said plurality of dispensing stations are positioned in series along said first conveyor and wherein said first conveyor transports said containers from said first dispensing station to each of said plurality of dispensing stations.

7. The system of claim 1, further comprising:

a plurality of dispensing stations,

wherein said plurality of dispensing stations are positioned in series along parallel portions of said first conveyor and wherein said first conveyor transports said containers from said first dispensing station to each of said plurality of dispensing stations.

8. The system of claim 1, wherein said spacing mechanism is positioned adjacent to said first conveyor, so that said spacing mechanism spaces said containers to a predetermined pitch as said first conveyor transports said containers to said dispensing station.

9. The system of claim 8, wherein said transfer wheel is positioned adjacent to said first conveyor, wherein said transfer wheel comprises a plurality of first grooves for engaging each of said containers and moving said containers to said star wheel, and wherein a spacing between

adjacent ones of said first grooves of said transfer wheel maintains said predetermined pitch of said containers.

10. The system of claim 1, wherein said spacing mechanism comprises a timing screw comprising a series of helical ribs for engaging and spacing each of said containers to said  
5 predetermined pitch.

11. The system of claim 10, wherein a width of each of said helical ribs increases progressively as said ribs are positioned along a longitudinal axis of said timing screw, so that said infeed timing screw progressively spaces said containers to said predetermined pitch.

12. The system of claim 4, wherein said star wheel comprises a plurality of second grooves  
10 and wherein each of said plurality of second grooves positions one of said containers in alignment with a respective dispensing head.

13. The system of claim 1, wherein said star wheel comprises a plurality of second grooves and wherein a spacing between adjacent second grooves of said star wheel maintain said predetermined pitch of said containers.

15 14. The system of claim 1, further comprising:  
a wherein

15. The system of claim 1, wherein said transfer wheel comprises a plurality of third grooves for engaging said containers and moving said containers to said star wheel.

16. The system of claim 1, wherein said star wheel comprises a plurality of second grooves  
20 for engaging and conveying said containers through said dispensing station.

17. The system of claim 16, further comprising:  
an arcuate guard rail positioned adjacent to said star wheel for maintaining each of said containers within a respective one of said first grooves.

18. The system of claim 16, wherein said plurality of second grooves comprises a range of  
25 about twelve (12) second grooves to about one hundred (100) second grooves.

19. The system of claim 1, wherein said star wheel transports a range of about four hundred and eighty (480) containers per minute to about one thousand (1,000) containers per minute through said dispensing station.

20. The system of claim 4, wherein said dispensing heads rotate with said feeder bowl and wherein said star wheel transports each of said containers in synchronization with a respective one of said dispensing heads to receive said predetermined quantity of items.

21. The system of claim 4, wherein said star wheel transports each of said containers at a rotational speed that is substantially similar to a rotational speed of said dispensing heads.

22. The system of claim 1, further comprising:

at least one base segment positioned beneath said star wheel for supporting said containers as said star wheel transports said containers through said dispensing station.

23. The system of claim 1, wherein said turret transfers said containers to said first conveyor.

24. The system of claim 1, wherein said turret comprises a plurality of container-receiving grooves for maintaining said pitch of said containers.

25. The system of claim 1, wherein said turret and said transfer wheel are located adjacent to said first conveyor.

26. The system of claim 3, further comprising:

a bulk delivery apparatus for dispensing said items to said feeder bowl.

27. The system of claim 3, further comprising:

a control unit for controlling a rotational speed of said rotation drive and a vibration of said feeder bowl vibration device and said at least one dispensing path vibration device, so that said dispensing paths dispense said items singularly.

28. The system of claim 1, further comprising:

at least one drive for rotating each of said timing screw, said transfer wheel, said star wheel, and said turret; and

a control unit, wherein said control unit controls said at least one drive, so that said at least one drive rotates each of said timing screw, said transfer wheel, said star wheel, and said turret, such that said containers move continuously to and through said dispensing station.

29. A method of dispensing predetermined quantities of items to containers comprising the steps of:

conveying a plurality of containers to a first dispensing station;

spacing said containers to a predetermined pitch;

transferring said containers to said first dispensing station;

transporting said containers through said first dispensing station; and  
removing said containers from said first dispensing station.

30. The method of claim 29, further comprising the steps of:

dispensing items to said containers at said first dispensing station; and  
conveying said containers to a second dispensing station or a packaging station.

31. The method of claim 29, further comprising the step of:

conveying said containers from said first dispensing station to a plurality of  
dispensing stations.

32. The method of claim 29, further comprising the step of:

spacing said containers to a predetermined pitch while said containers are being  
conveyed to said first dispensing station.

33. The method of claim 29, further comprising the step of

maintaining said predetermined pitch of said containers during said steps of  
transferring, transporting, and removing said containers.

34. The method of claim 29, further comprising the step of:

dispensing predetermined quantities of an item to each of said containers as said  
containers are transported through said first dispensing station.

35. The method of claim 29, further comprising the steps of:

dispensing a plurality of items from a hopper onto a rotary, vibratory dispenser;

rotating said rotary, vibratory dispenser; and

vibrating said rotary, vibratory dispenser, so that said items are dispensed  
singularly from each of a plurality of dispensing paths of said rotary, vibratory dispenser.

36. The method of claim 35, further comprising the step of:

measuring a physical characteristic of each of said singularly-dispensed items.

37. The method of claim 29, wherein the step of transporting said containers through said  
dispensing station comprises the step of transporting a range of about forty-eight (48) containers  
to about one hundred (100) containers through said dispensing station simultaneously.

38. The method of claim 29, further comprising the step of:

dispensing predetermined quantities of items to a range of about 480 containers  
per minute to about 1,000 containers per minute.

39. The method of claim 29, further comprising the steps of:  
dispensing a plurality of items from a hopper into a feeder bowl; and  
vibrating said feeder bowl, such that said items are dispensed from said feeder  
bowl to a plurality of dispensing paths positioned around said feeder bowl.

5 40. The method of claim 39, further comprising the steps of:  
rotating said dispensing paths; and  
vibrating said dispensing paths.